

**OPERATORS MANUAL &
FITTING INSTRUCTIONS
FOR
CENTERLINE**

No. 020-021-UK Version 1.11



Mølhavevej 2
9440 Aabybro
Denmark
Tlf. +45 9696 2500
Fax. +45 9696 2501

www.teejet.com

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- Functional faults, which apply to or from a PC-program or PC-equipment, not delivered by the seller,
- Faults that may arise from the buyers negligence to react to warnings and fault messages from the product, or which can be traced to negligence and/or absent constant control of the work carried out in comparison to the planned job.

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With regards

TeeJet[®]

Technologies

Mølhavevej 2

9440 Aabybro

Denmark

Tlf. +45 9696 2500

Fax. +45 9696 2501

www.teejet.com

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INTRODUCTION

Congratulations on selecting the CenterLine

We – your supplier – feel certain that you will quickly learn to use it and within a short time get the full benefit of this modern technology.

Please read this operator manual:

Sit in the tractor seat with the **engine switched off!**

Read the “Introduction to guidance” and look at the drawings on pages 10 & 11.

Get to know the 6 remote control buttons and their functions.

Learn to navigate through the menus.

Read the explanations for each menu item that you don't understand carefully.

Only now, if you feel at home with the CenterLine, should you start the tractor for the first test run.

Enjoy!

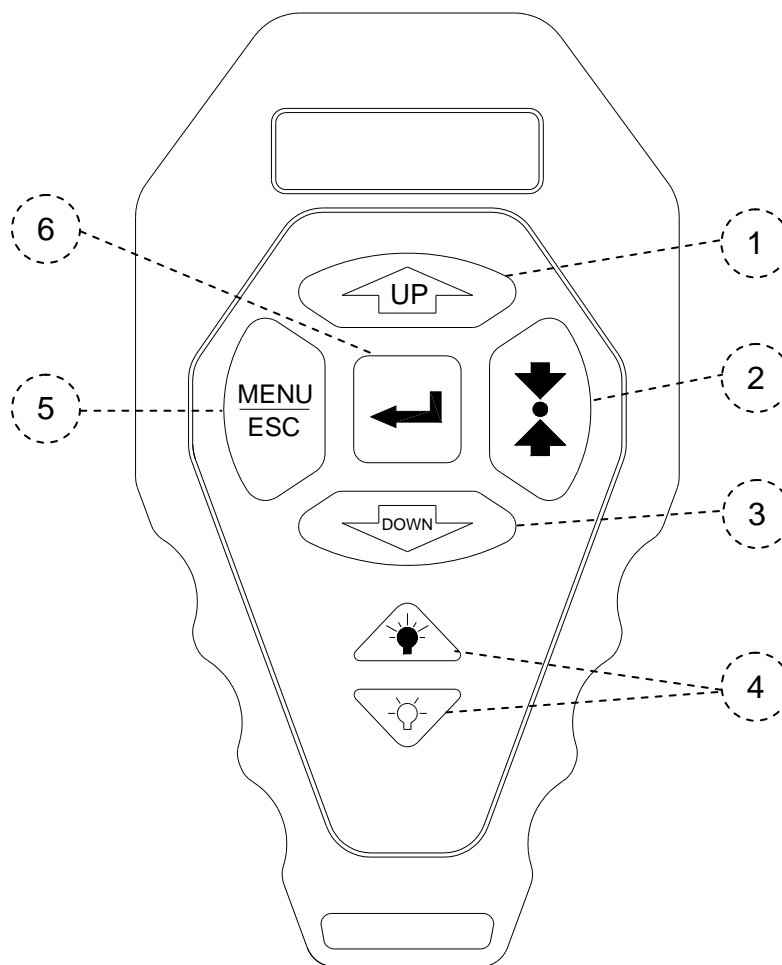
GENERAL OPERATION

The CenterLine system consists of three main components; a DGPS receiver, the lightbar and a wireless remote control. All of the menus for operation and encoding the CenterLine are shown on the lightbar and are selected by using the wireless remote control. Settings for the DGPS receiver depend on the type of receiver used; please refer to the documentation supplied with the DGPS receiver.

A description of the wireless remote control and the lightbar follows:

THE WIRELESS REMOTE

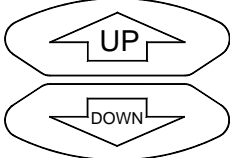
As mentioned before CenterLine is operated via the wireless remote and a description of the buttons can be seen in the following:



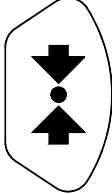
2008-0025

Pos.	Description	Pos.	Description
1	Arrow up key	4	Brightness up and down keys
2	Return to point key	5	Menu/Escape key
3	Arrow down key	6	Enter key


ARROW UP & DOWN KEYS (POS. 1 & 3)

Key	Description
	<p>These keys are used to page through the menus, sub-menus and the various settings that are available in the menus.</p>


RETURN TO POINT KEY (POS. 2)

Key	Description
	<p>This key is used to mark a position in the field and then to later return to the marked position. The return to point function is typically used if work in the field is stopped and the point at which work stopped is to be found when work commences again. A description of this function can be seen on page 15.</p>


BRIGHTNESS + & - KEYS (POS. 4)

Keys	Description
	<p>Repeatedly pressing the brightness + key will increase the brightness of the lightbar. Likewise repeatedly pressing the brightness – key will decrease the brightness of the lightbar. Different light conditions, i.e. bright sunlight or night work can be compensated for with this function.</p>

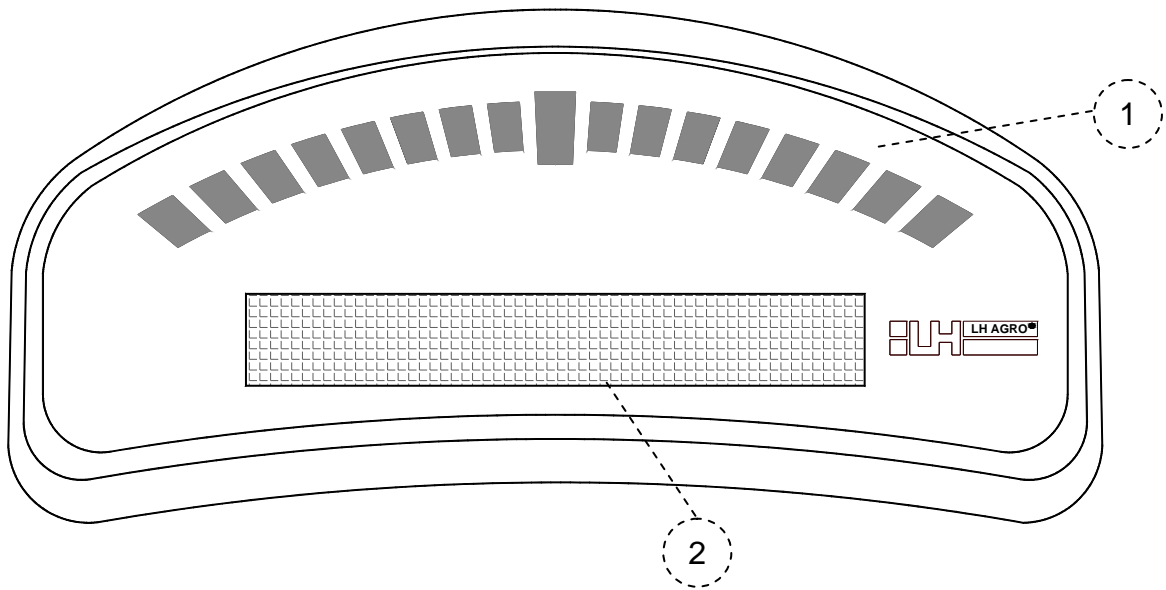
MENU/ESCAPE KEY (POS. 5)

Key	Description
	<p>This key is used to leave a menu item. Each press of this key pages one step back in the menu structure. If the key is pressed when encoding, the specific setting will not be saved.</p>

ENTER KEY (POS. 6)

Key	Description
	<p>The enter key is used to open a menu plus to select and accept an encodement.</p>

THE CENTERLINE LIGHTBAR



2008-0026

Pos.	Description	Pos.	Description
1	Lightbar lights	2	Menu screen

LIGHTBAR LIGHTS (POS. 1)

An indication of the present position in comparison to the required position. When driving “on track” the middle light will be lit.

MENU SCREEN (POS. 2)

Operating information and the various menus are displayed here.

AN INTRODUCTION TO PARALLEL SWATHING

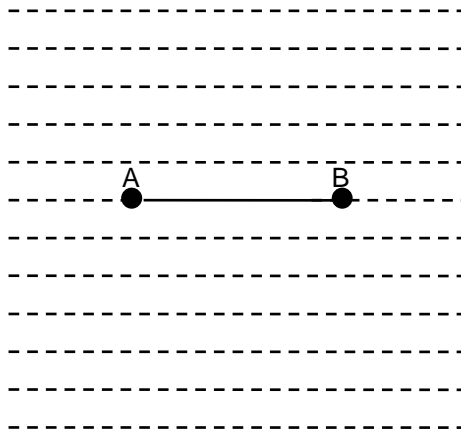
Parallel swathing can be carried out in three different ways; driving around the headland and parallel to a straight line or a curved line. Typically, work will start by driving around the headland 2 or 3 times and thereafter “side to side” (as with tramlines).

Whilst driving around the headland it is possible to create a reference line from which the remainder of the field can be driven parallel to. This reference line is created by marking 2 points, point A and point B. The shortest possible distance between 2 points is a straight line and this straight line is the reference line that is driven parallel to for straight guidance(not the headland).

The reference line can be created, as mentioned before, whilst working the headland, but also at any other time whilst driving. Once the reference line is marked, it is possible to drive parallel to this line anywhere in the field.

STRAIGHT GUIDANCE

Straight guidance is simply driving in a straight line parallel to the reference line created with points A & B. Once the reference line has been created it is possible to drive parallel to the left and/or the right of the line and before and/or after the initial reference points (A & B), the following diagram illustrates this:



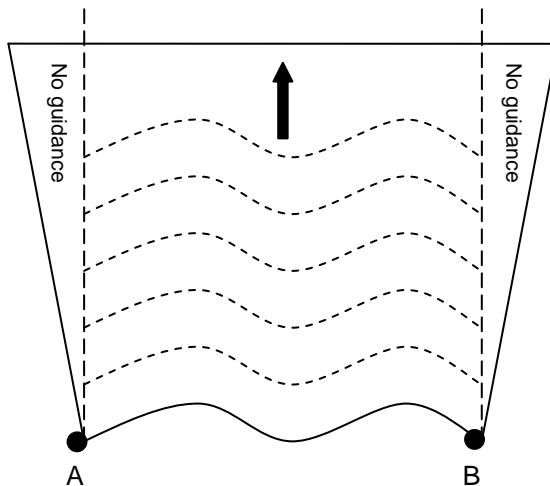
The solid line represents the reference line created with points A & B.

The dashed line shows that parallel lines are automatically created on the left- and right-hand side plus in front of and behind the reference line.

*This means that parallel guidance **is** possible outside the points A and B*

CURVED GUIDANCE

Curved guidance is driving parallel to a curved line in a similar fashion to straight guidance. Parallel guidance is possible to the left and/or right of the reference line but not before or after the initial reference points. The following diagram illustrates this:



The solid line represents the initial reference line created with points A & B. The dashed lines show that parallel lines are automatically created in front of the initial reference line.

*The dashed lines also show that parallel lines are **not** created in to the side of the initial reference points*

*This means that curved guidance is **not** possible outside of the points A and B*

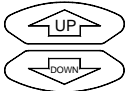


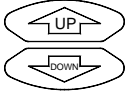

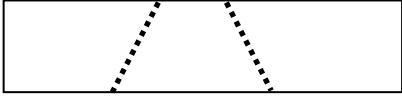
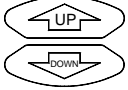



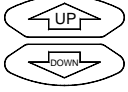
HEADLAND GUIDANCE

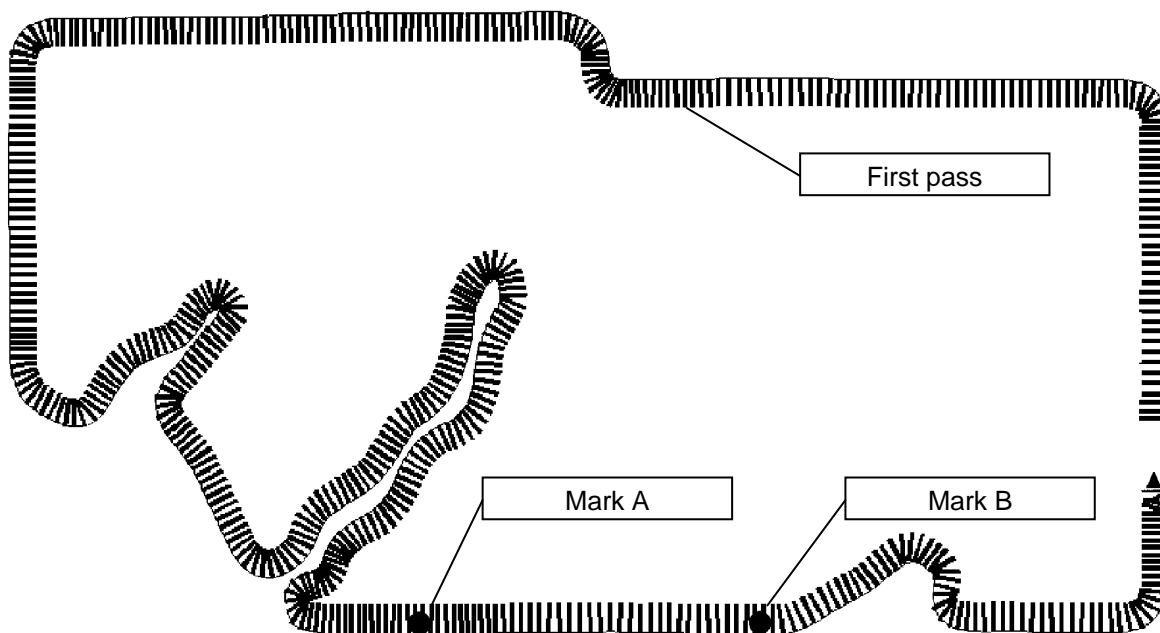
Headland guidance is driving parallel around the headland of the field. Once the headland has been completed it is possible to drive to the left and/or to the right of the initial bout. A reference line (A & B) for straight or curved guidance can be created whilst in headland mode.

A detailed example of headland guidance can be seen on page 11.

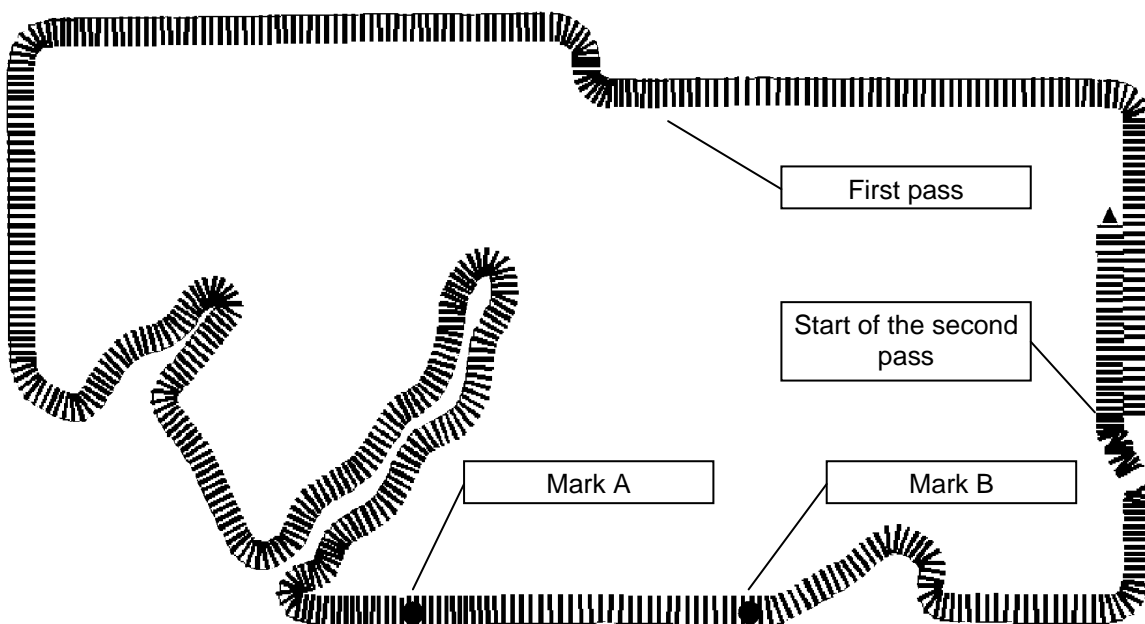
A WORKING EXAMPLE

The following example shows that the headland is driven twice. Two reference marks are made to create the straight reference line that the rest of the field is to be driven parallel to:

Step	Key	Display	Description
1		Start	Select "Start" to begin real-time guidance.
2		New?	Start a new field
3		Spray On	Only displayed if "STATUS" = OFF under setup.
4		Headland?	Select for headland work.
5			Start working the headland. 2 lines are shown in the display.
6		New A - B	Prepare for a new reference line.
7		Mark A	Start the reference line.
8		Mark B	Drive the straight line.
9			Stop marking the reference line.
10		Straight?	Change to straight work.

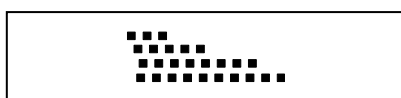


The first pass is almost finished and the marks for the reference line have been created (mark A & B) for which the rest of the field will be driven parallel to. See steps 7, 8, & 9 in the above for marking the reference line).

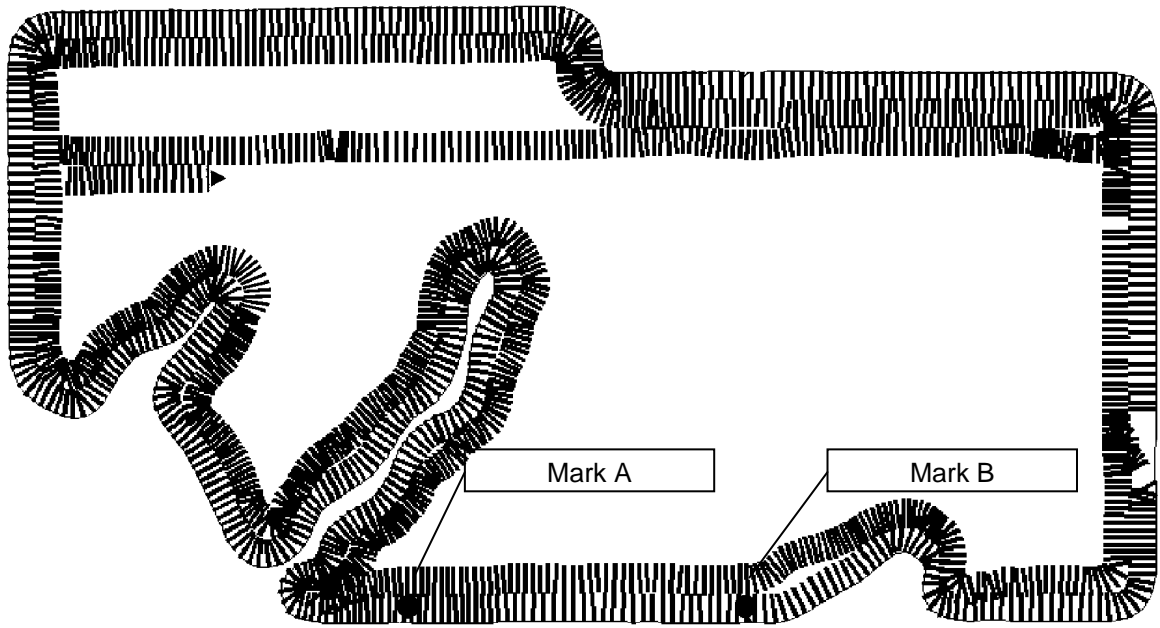


The second pass of the headland has just been started. Marks A & B were created in the first pass around the headland.

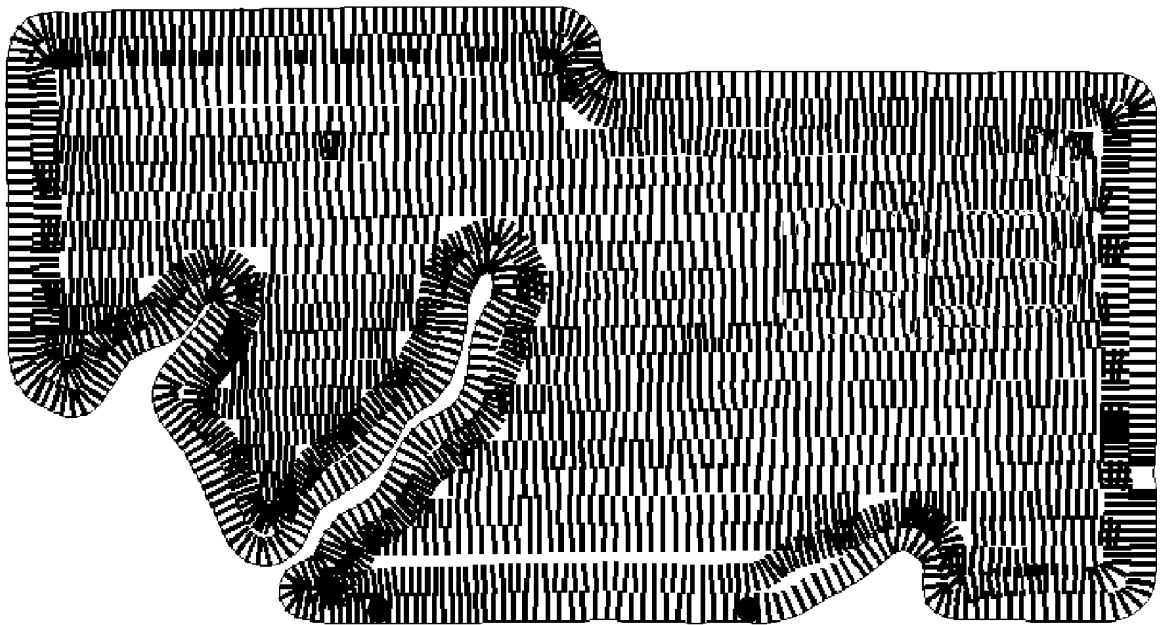
When changing from the first to the second pass around the headland the following is displayed:



This shows that a left turn is approaching.



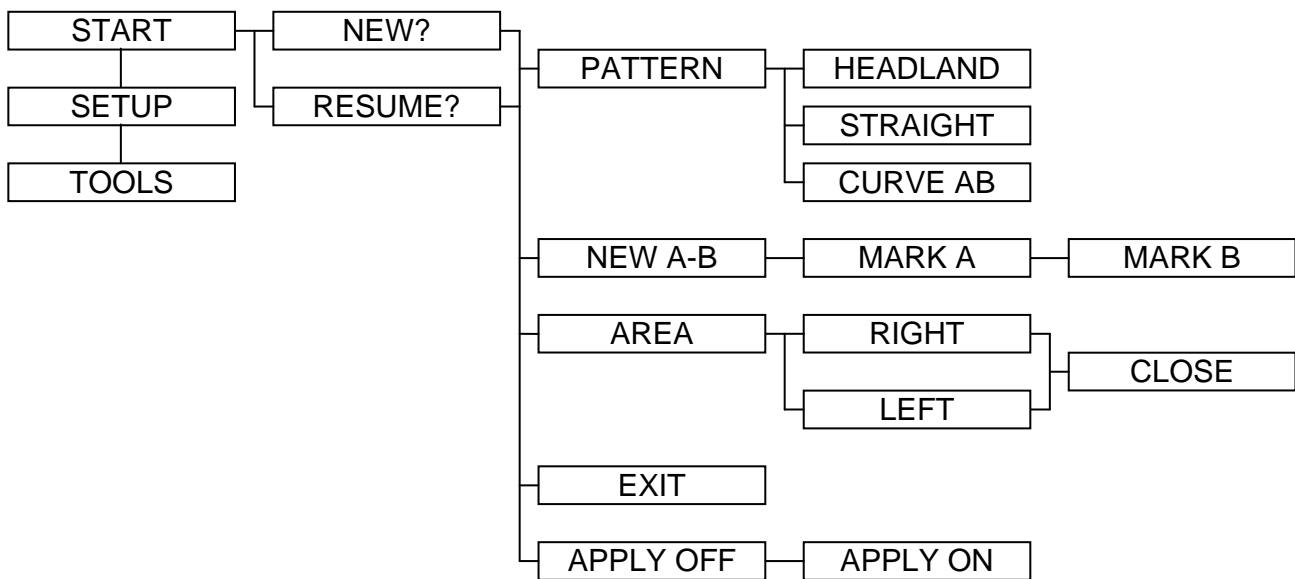
The second pass around the headland is finished and work has started parallel to the straight reference line, which was created with marks A & B during the first pass around the headland.



The field is finished.

OPERATION

OPERATING MENU OVERVIEW



GENERAL

Each menu item is described in the following:

Encoding all settings is necessary for correct operation, see ENCODE on page 17.

NEW?

Select this if starting a new field. Previous fieldwork will be erased (not encodements).

RESUME?

Select this to continue work in a previously worked field.

APPLY ON/OFF

This function is only displayed if “STATUS” = OFF under encode – see page 19.

If the system is not fitted with an “implement sensor” (see “FITTING THE CENTERLINE” on page 24) then this function is used to, manually, tell the system whether the implement is in work or not.

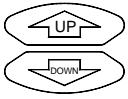



If the system is fitted with an “implement sensor” and “STATUS” = ON under encode the system will automatically detect if the implement is in work or not.

HEADLAND/STRAIGHT/CURVE AB

Select whether the machine is driving around the headland or driving straight (parallel to a reference line) – see “AN INTRODUCTION TO PARALLEL SWATHING”) on page 8.

NEW A – B

Selecting this function allows a new reference line to be created. The procedure for creating a new reference line follows:

Step	Key	Display	Description
1		New A - B	Prepare for a new reference line.
2		Mark A	Start the reference line.
3		Mark B	Drive the straight stretch.
4			Stop marking the reference line.

All straight guidance work hereafter will be parallel to the reference line. A new reference line can be created at any time during work in the field by following this (the above) procedure.

The reference line remains in the memory until either:

1. A new real-time guidance is started (using the "Continue?" function keeps the reference line).

Or

2. A new reference line is created (only one reference line can be stored at a time).

AREA

It is possible to measure and thereafter see, e.g. the size of the field, with this function.

The field area is automatically calculated from the driven circumference (of, i.e. the field).

If the field area has not been measured with the CenterLine before then select whether the actual field boundary is on the RIGHT- or LEFT- hand side of the implement after selecting the AREA function. The display shows that area is being measured whilst driving.

The area measurement will automatically stop and close the boundary when the implement is within 4.5 metres of the start position. The boundary can also be closed manually by selecting "CLOSE". When the boundary is closed, the field size is calculated and the area is saved. The calculated area is displayed for 3 minutes and can be seen again by selecting the "SHOW" function under the AREA menu.

The calculated area remains in the memory until either:

1. A new real-time guidance is started (using the "Continue?" function keeps the calculated area).

Or

2. A new area measurement is started.

E-DIF

Using e-Dif is normally not necessary in area where correctional signals from Egnos are available.

Only displayed if the system is fitted with a RX350P Egnos DGPS receiver (no. 78-50108).

Calibration for the e-Dif receiver. Please see the description on page 22.

USING THE RETURN TO POINT FUNCTION

The “Return to point” function is used when a marked position in the field is to be found again. This function is typically used when work in the field is stopped and the point at which worked stopped is to be returned to.

The “Return to point” function is operated with the “Return to point” key (pos. 2, see page 7).

When a certain position is to be marked simply press this key. The marked position will remain in the memory until either:

1. A new real-time guidance is started (using the “Continue?” function keeps the marked position).

Or

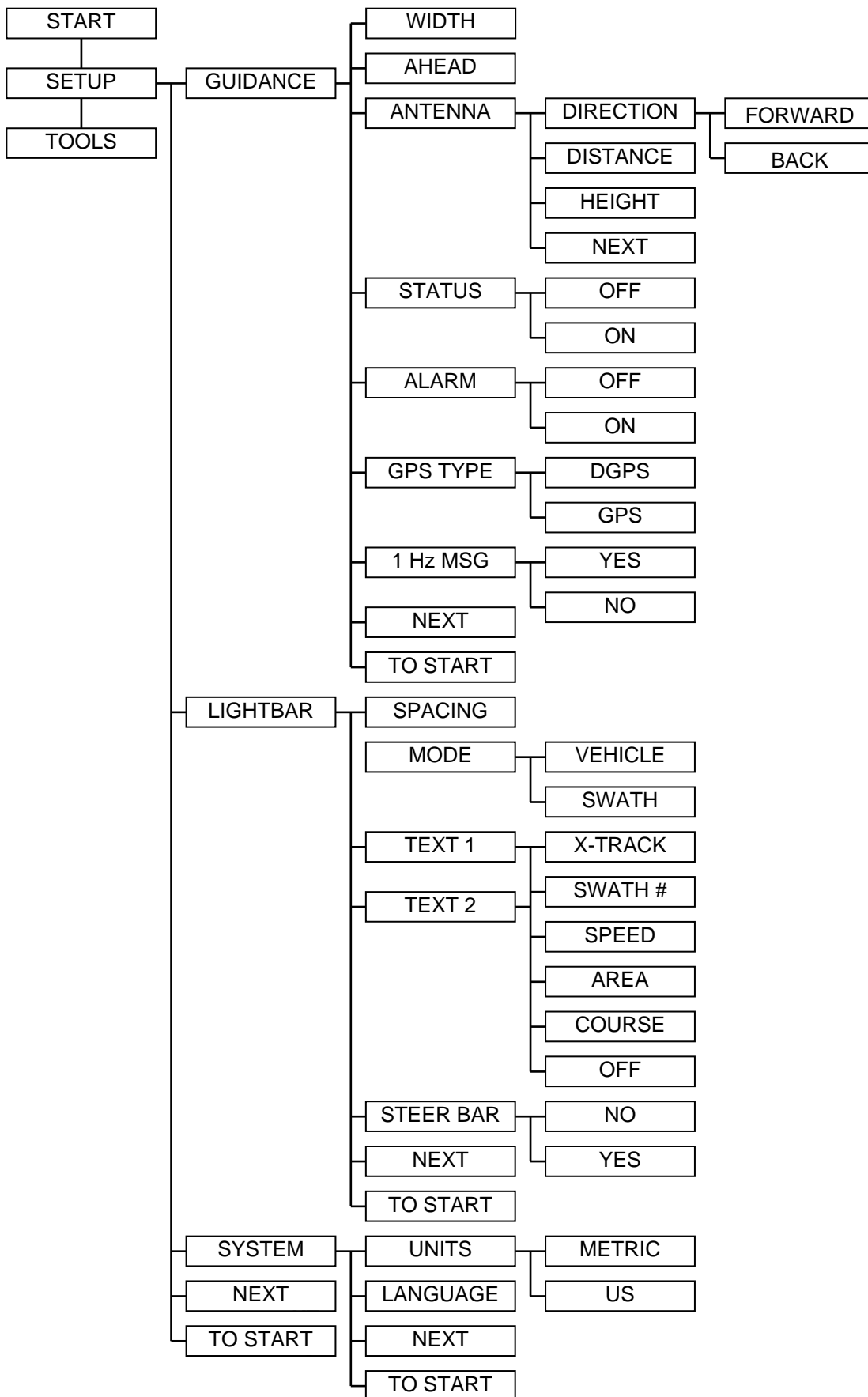
2. A previously marked position is returned to and the key is pressed again (3rd.time).

When the marked position is to be found again simply press the key again. The lightbar guidance lights will show the way to drive and the display will show the distance (in metres) between the present position and the marked position.

Press the “Menu/Esc” key to exit the “Return to point” function when the previously marked position has been found.

ENCODE

SETUP MENU OVERVIEW



GENERAL

There are two shortcuts in the setup menus, NEXT and TO START.

Selecting the NEXT function will automatically page back to the main menu for the sub menu. Therefore, if, i.e. the SYSTEM menu is active and the NEXT function was selected then the menu will automatically “jump” back to SETUP.

If the TO START function is selected, regardless of what menu is active, then the system will automatically “jump” to the real-time guidance menu (operation). This function can, e.g. be used if a setting needs to be altered during operation and then the guidance task is to be continued.

We recommend encoding the system settings first as these decide, amongst other things, the units used for operation and the other settings (see page 20).

GUIDANCE

All vehicle and implement related settings are encoded here.

The following settings presuppose that UNITS (in the SYSTEM menu) has been set to METRIC and that the LANGUAGE is set to ENGLISH:

WIDTH

Encode the distance between the tracks in steps of 10 cm (min = 1m, max = 100m).

This width is typically the working width of the implement. If the encoded width is set slightly smaller than the actual working width of the implement then chances for “misses” in the field is reduced. If the encoded width is slightly larger than the actual width of the implement, then overlapping will be reduced.

AHEAD

Encode, in seconds, how far ahead the Centerline should look ahead (typically set to 1.5 or 2 seconds).

The look ahead function takes the current speed, direction plus this look ahead value and calculates where the vehicle will be in relation to the current track. The value to be encoded depends greatly on the machine operator.

When set to 0 the system does not use this function.

ANTENNA

The DGPS antenna is typically fitted either in front or behind the implement (front mounted implements). Encode whether the DGPS antenna is in front or behind the implement plus the distance between the antenna and the implement.

DIRECTION: Select “BACK” if the implement is behind the DGPS antenna. Select “FORWARD” if the implement is in front of the DGPS antenna.

DISTANCE: The distance between the DGPS antenna and the implement is encoded in steps of 10 centimetres (min. = 0m, max. = 300m). Consider the “drop point” of the implement. If the implement used is i.e. a fertiliser spreader then the product will hit the ground up to 40 metres behind the DGPS antenna.

HEIGHT: The height from the ground to the DGPS antenna is encoded in steps of 10 cm (min. = 0m, max. = 10m).

STATUS

If this setting is encoded to “ON”, then the CenterLine will receive a signal from the implement telling whether the implement is in work or out of work (see page 24). This is used for, amongst other things, area measurement and warnings for previously worked area (see the following alarm description).

If “OFF” is selected (standard setting) then the CenterLine will not give a warning for previously worked area regardless of whether the implement is in work or out of work.

ALARM

If “ON” is selected under ALARM then the CenterLine will give a visual warning when a previously worked area is approached or driven into. **APPLIED** is shown in the display when previously worked area is driven in, e.g. the headland.

If “OFF” is selected then no warning will be given when driving in previously worked areas.

GPS TYPE

If differential corrections are not available, setting this menu item to GPS will allow work to continue without reference signals.

When the standard setting (DGPS) is used a warning will appear on the CenterLine and work can not continue should the differential signal be lost.

Accuracy will be greatly reduced if work is carried out without DGPS signals. We do not recommend changing this setting.

1HZ MESSAGE

If the DGPS receiver being used is not able to send data to the CenterLine at an acceptable rate it is possible to allow the system to accept DGPS signals from such a receiver.

When the standard setting (NO) is used a warning will appear on the CenterLine if the DGPS signals are not being received fast enough.

Accuracy will be greatly reduced if work is carried out with slow DGPS signals. We do not recommend changing this setting.

LIGHTBAR

Settings related to the lightbar are encoded in the LIGHTBAR menus. A description of these settings follows:

SPACING

This distance expresses the distance each LED on the lightbar represents. The spacing can be set from 10 cm to 300 cm in steps of 10 cm.

MODE

If MODE is set to "VEHICLE" then the middle line on the lightbar represents the position of the implement. Steer the machine so that the middle line of the lightbar is moved to the moving light.

If MODE is set to "TRACK" then the middle line of the lightbar represents the track. Steer the machine so that the moving light is moved to the middle of the lightbar.

TEXT 1 & TEXT 2

Select one of the following text messages (one for TEXT 1 plus one for TEXT 2) to be displayed whilst working:

X-TRACK:	Shows the distance between the required track and the actual position of the machine.
SWATH #:	Shows the actual track number.
SPEED:	Shows the present forward speed as kilometres per hour.
AREA:	Shows the measured area that has been worked (not to be confused with the calculated area from the AREA function as described on page 15).
COURSE:	Displays the machine heading in degrees.
OFF:	No information is displayed.

STEER BAR?

When the STEER BAR option = "Yes" then all lights will be lit from the centre to the left or right indicator light, whereas if the STEER BAR option = "No" (standard setting) then only the left or right indicator light will be lit.

SYSTEM

UNITS

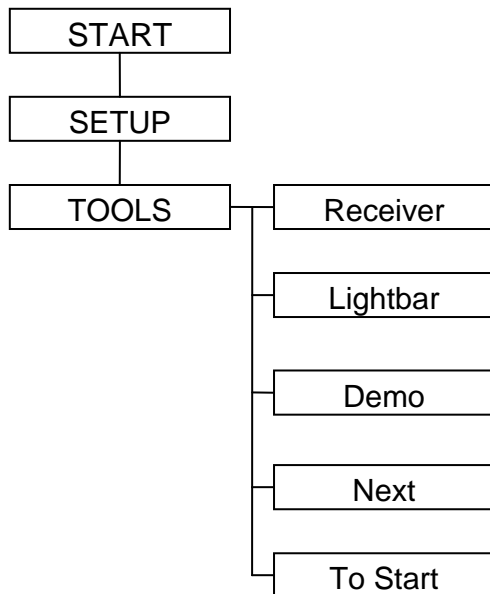
The units used for operation and encoding. Select between US (feet & inches) and METRIC (metres & centimetres).

LANGUAGE

Select the operating language of the CenterLine.

TOOLS

TOOLS MENU OVERVIEW



It is possible to see the present DGPS status and run a lightbar test in the TOOLS menu.

Selecting the NEXT function will automatically page back to the main menu for the sub menu. Therefore, if, i.e. the SYSTEM menu is active and the NEXT function was selected then the menu will automatically “jump” back to SETUP.

If the TO START function is selected, regardless of what menu is active, then the system will automatically “jump” to the real-time guidance menu (operation). This function can, e.g. be used if a setting needs to be altered during operation and then the guidance task is to be continued.

RECEIVER STATUS

Selecting this function displays the status of the received DGPS signals. The following describes the displayed information:

- <DGPS> is shown when valid DGPS signals are received.
- <GPS> is shown when GPS signals are received without reference signals.
- <No GPS> is displayed when no positional signals are received. Real-time guidance and area calculation work can **not** be carried out.
- <NONE> is shown when no GGA or VTG data is received.
- <GGA> is shown when GGA data is received.
- <VTG> is shown when VTG data is received.
- <X HZ> shows how often GGA or VTG data is received per second.

LIGHTBAR

A test sequence for all lights on the lightbar is started when this is selected.

DEMO

When DEMO is selected the CenterLine will run a small demonstration program. The word "DEMO" will be displayed at regular intervals to show that the system is in fact in demo mode.

E-DIF

Using e-Dif is normally not necessary in area where correctional signals from Egnos are available.

Only displayed if the system is fitted with a RX370p EGNOS DGPS receiver (no. 78-501048).

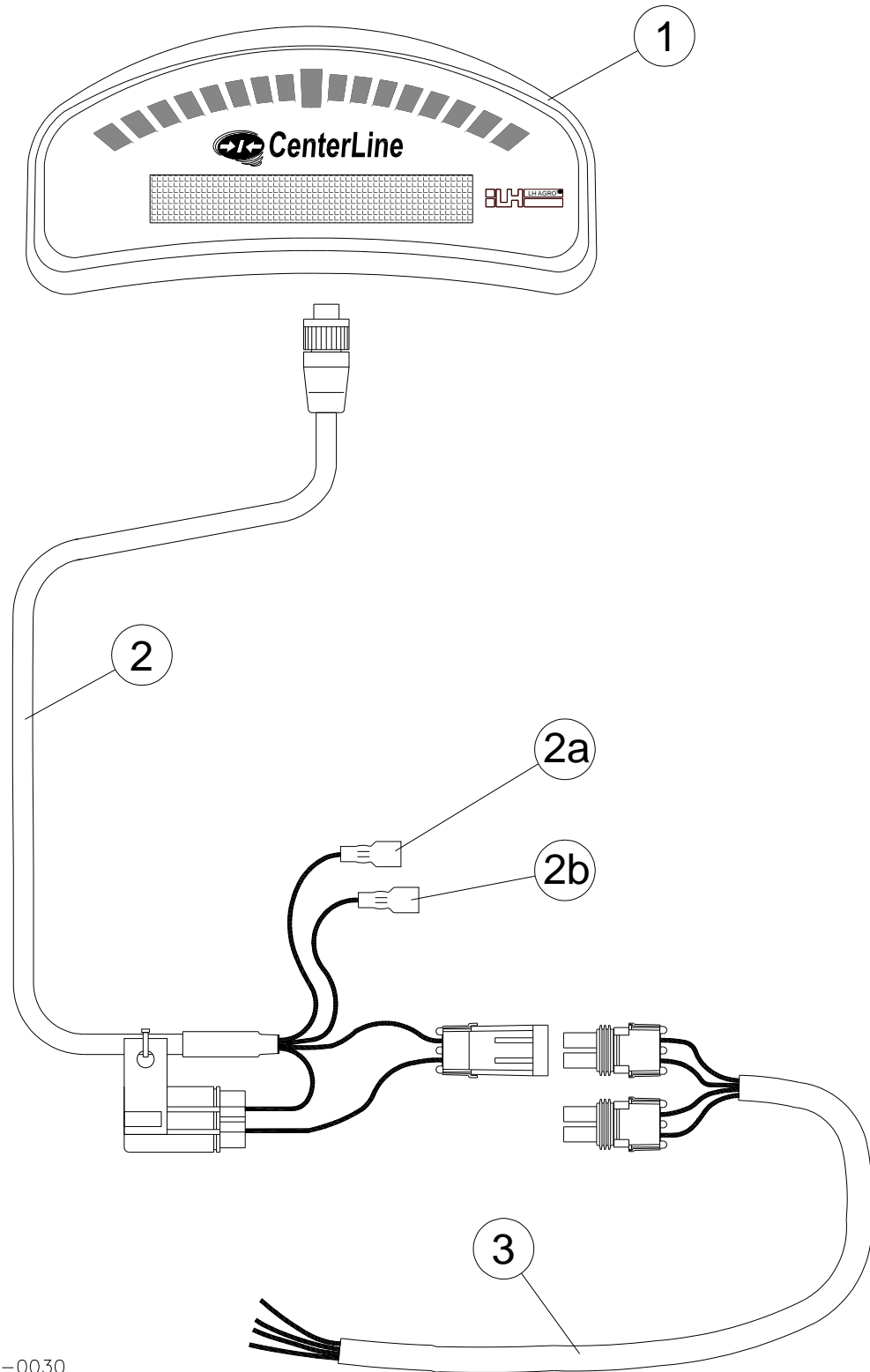
e-Dif can is a "synthetic" differential signal created by the software in the DGPS receiver.

To calibrate the receiver select this menu item. "Wait" is displayed whilst the system is calibrated.

We recommend calibrating the e-Dif receiver every 1 to 2 hours.

FITTING THE CENTERLINE

SYSTEM OVERVIEW



2008-0030

FITTING

GENERAL

Route all cables so that they are protected as much as possible and preferably together with existing cables, hydraulic pipes, etc. fix all cables with cable ties.

Avoid moving parts and heat sources, e.g. exhaust pipes.

FITTING THE LIGHTBAR (POS. 1)

As the lightbar is operated with a wireless remote control and is weather resistant, then fitting the lightbar to the front of the tractor is preferable. Use the supplied fitting bracket.

CENTERLINE POWER CABLE CONNECTION (POS. 2)

Connect the plug to the similar socket on the lightbar and tighten.

If the tractor is fitted with a 3-pin "Cobo socket":

- Remove the 2-pin connector (marked "BAT") – connect the red wire to +12V (marked + in the cobo plug), the black wire to 0V (marked – in the cobo plug) and the white wire to the small pin in the plug (ignition live).

If the tractor is not fitted with a 3-pin "Cobo socket":

- Connect the 2-pin plug (marked "BAT") to the battery cable pos. 3.
- The white wire (pos 2a – marked "Ignition Sense") **MUST** be connected to the ignition so that it receives +12V when the ignition is switched on.

The brown wire (pos 2b – marked "Boom Sense") can be connected so that it receives +12V when the implement is **in work** and 0V or nothing when the implement is **not in work**. Connecting this wire is not necessary if the "STATUS" function is not to be used. If this wire is connected as described then the STATUS setting must be encoded to ON – see page 19.

BATTERY CABLE CONNECTION (POS. 3)

If the tractor is not fitted with a 3-pin "Cobo socket":

Connect the battery cable to the battery using the supplied battery terminals.

Red = +12V

Black = 0V

This cable can be used to power a DGPS receiver but depends on the receiver type.

CONNECTING THE DGPS RECEIVER

Connect the DGPS receiver to the socket on the back of the lightbar and tighten.

Attach the DGPS receiver in the middle (left/right) of the tractor roof either using the supplied metal plate with adhesive sticker or using the supplied screws.